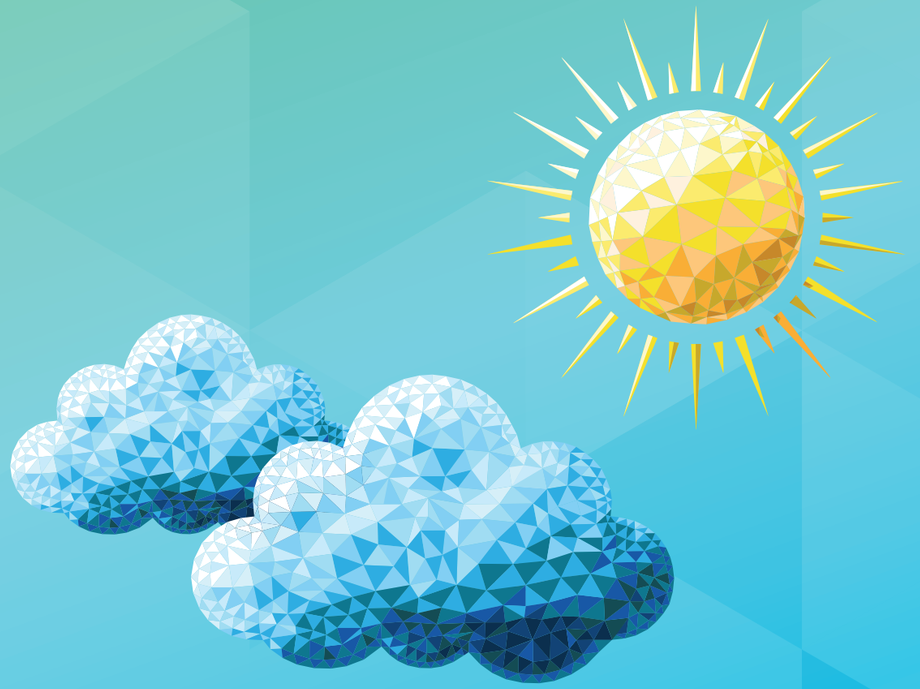
MANAGING RISK IN RENEWABLE ENERGY PROJECTS



with Dan Stevens

Risk Engineer, AXIS Renewable Energy Team.

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We caught up with our Risk Engineer in the Renewable Energy team Dan Stevens to talk about the past, future and opportunities within the renewables industry.

From leaving the University of East Anglia, where he studied Environmental Science, Dan has been involved in the renewable energy industry for 20 years. Inspired by a lecturer who was passionate about wind energy, he started his first role at National Wind Power (now Innogy Renewables) running their wind measurement campaigns back when there were very few jobs in the industry.

Dan's career has seen him work at both utilities (RWE, SSE) and a consultancy firm (Renewables Consulting Group, RCG) before joining AXIS in the insurance sector.

YOU CAN ONLY IMPROVE YOUR PREDICTIONS FOR THE FUTURE IF YOU LOOK BACK AT WHAT'S HAPPENED IN THE PAST.

You've worked in both the utilities and consultancy organisations, what inspired you to move to the insurance sector?

I was looking to gain a different perspective. After working in utilities for 15 years and an engineering consultancy I felt that I'd learnt a lot about how to design a project and run it efficiently. But I realised that to progress I needed to understand what happens when things go wrong, and the reasons behind it.

I'm a big believer that you can only improve your predictions for the future if you look back at what's happened in the past. With the amount of projects AXIS has written, our insurance organization becomes a fantastic resource in that respect.

What were the key elements of your previous job?

I was in Technical Advisory at RCG which mainly involved carrying out due diligence (DD) on renewables projects and portfolios either for investors, or for companies looking to sell. I worked on onshore wind, offshore wind, solar, and some large portfolios combining all three. My role was split into three parts: winning work, doing the work, and working on a steering committee, which involved strategic planning for the business. I generally project managed the DD work and wrote the sections of the report on energy resource, site suitability, Operational Expenditure (OpEx) and some of the contracts.

A big part of my job was business development and we were successful in getting mandates from some big equity investors, which was rewarding.

Could you explain exactly what due diligence is for a renewables project?

Technical due diligence aims to evaluate all elements of a project that drive the risk/reward associated with it, from an investor's perspective.

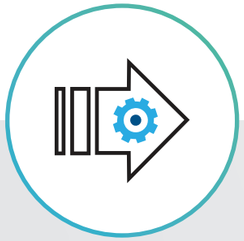
Depending on whether the project is in development, under construction, or operational, the exact scope will vary, but generally you're opining on the predicted energy yield, technology type (what type of turbine or solar plant is proposed, and what their track record in the industry is, foundation types if offshore), the key contracts (Turbine and Balance of Plant supply and associated warranties), service agreements, predicted OpEx costs and Capex costs if it's not built yet.

The analysis is generally delivered as a risk review, with suggested mitigations to reduce the risk.

Managing risk is a big term, what do you see as the single most important factor to managing risk?

Having a tried and tested risk management framework built on deep experience of how risks propagate and manifest themselves is crucial. Applying that to new technology or more extreme environments will always be a challenge but I'm a great believer in good design.

To capture the risk properly you need to be on top of how a project has been designed, and on what assumptions that design was based.



What change have you seen in finance and private equity for renewable energy projects?

Over the last three years, I have seen equity investors that would traditionally only look at operational projects – like pension funds – take more and more “development risk”.

We’ve moved from investors being happy with 5% returns associated with buying operational wind farms and solar projects, to looking for projects in development that might yield double. Interest rates and low cost of capital have played a part in driving this appetite, but it’s also a product of investors getting more and more comfortable with the technology and the developers’ ability to construct projects on time and on budget.

It’s safe to say weather is a big issue, which peril have you seen that has caused the most damage?

Hurricanes. They affected a couple of solar plants in the tropics which I visited. Normally the damage is caused by the wind speed or debris and torn up equipment, that has being picked up by the hurricane. In this case there was surprisingly little physical damage, to the plant itself.

The worst damage came after the event as a result of the grid going down. The solar farm had no power at night to keep all the inverters cool and dry, and as a result there was a lot of damage.

The projects had energy storage on site too, and the same thing happened to the batteries – they are very sensitive systems and rust very quickly in a tropical climate with no air conditioning.

What is the biggest or most significant change you've seen in the industry since you've started?

Without doubt, the drop in the cost of energy associated with new projects, especially offshore wind. We're now seeing large offshore wind projects being built without any subsidies. That's partly due to the vast construction experience many European utilities have by this point, as well as strong commitment from governments to uphold their side of the bargain with auction rounds, Offshore Transmission Owner build outs and standardised consenting frameworks.

It's so different to where we were when I started out in renewables.

And now looking back at your site visits - what's the craziest thing you've experienced?

I was halfway up climbing a 150-foot met mast in the middle of the sea when I noticed that the bolts holding it together had started to pull apart. I've never climbed down a ladder so fast!

And finally, let's look towards the future. Looking at wind, solar and energy storage, could you highlight a future trend for each of them.

The main trend will be cost reduction, with wind continuing to benefit from bigger turbines.

OFFSHORE

I'm not sure where the limit will be reached - already Siemens Gamesa is talking about a 15 MW unit, and assuming two-piece blades become standardised and don't run into major manufacturing problems I could envision 25 MW turbines being around by 2030.

ONSHORE

I think we'll be running wind and solar projects for longer as standard – 35, 40 years is all feasible providing there's a spares part market big enough to support it and a proactive approach to maintenance taken.

The alternative is re-powering with fewer, bigger units, but I don't see that being a huge market - maybe 25% of all new installations by 2030. People will realise you're essentially starting from scratch in such cases and very little can be re-used so that could suffer backlash from a recycling standpoint.

As we run out of prime locations to put them in, I envision wind turbines getting smarter in order to cope with more wake effects or difficult terrain and less restricted to rigid design classes.

BIFACIAL

Will become the norm in solar, and I think we'll see more integration into buildings and perhaps even civil infrastructure. Solar drainage channels, solar motorways? I do worry that we've got to go through the trend of poor quality control and price gouging that blighted the monofacial market before we get there. But hopefully not.

ENERGY STORAGE

(ES) will find a wider application than it's currently enjoying, certainly in the UK. This will require regulators and grid operators to get their heads together and propose a transparent system for the revenue stream.

Long term, I hope to see renewables with embedded storage where wind and solar projects are designed with ES fully in mind, rather than as an additional revenue stream or a requirement from the grid company.

Another key trend for storage is that it won't just be larger and larger containers full of Li-ion batteries. The technology will differ depending on the charge and discharge requirement of the individual application.